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AGITATOR RAISER AND BELT RELEASE FOR SUCTION CLEANERS

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2 SHEETS—SHEET 1

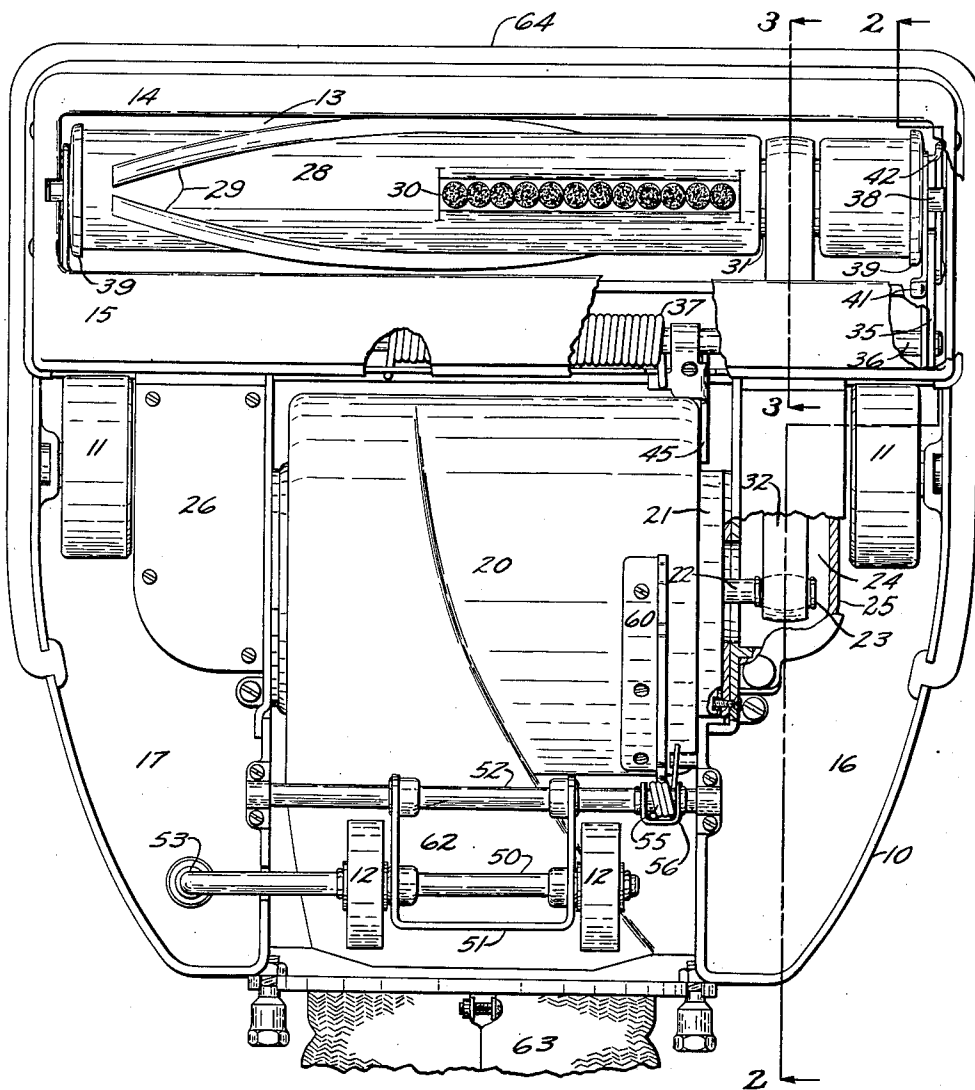


Fig. 1

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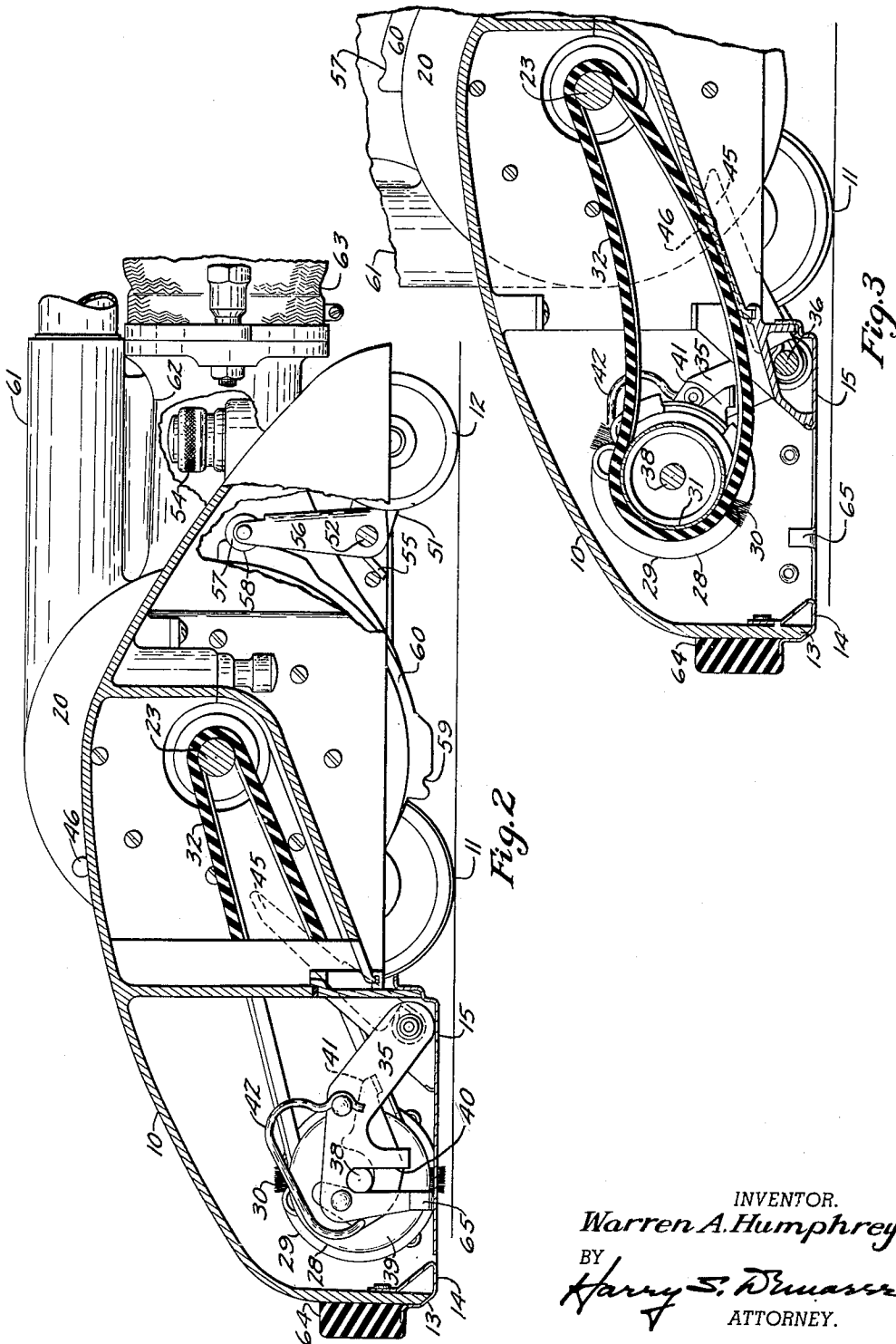
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2 SHEETS—SHEET 2



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AGITATOR RAISER AND BELT RELEASE
FOR SUCTION CLEANERSWarren A. Humphrey, Canton, Ohio, assignor to
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3 Claims. (Cl. 15—372)

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The present invention relates to suction cleaners and specifically to a suction cleaner having an agitator in the suction nozzle for agitating the surface being cleaned in which movement of the handle to a non-propelling position both raises the agitator up into the nozzle out of contact with the surface being cleaned as well as loosens the belt drive from the motor to the agitator to thus relieve the load on the motor.

The cleaner of this invention is particularly useful when means is provided for converting the cleaner from "on-the-floor" cleaning to "off-the-floor" cleaning at which time it is desirable to raise the agitator from the floor to prevent damage to carpets and other surfaces upon which the cleaner rests as well as to loosen the agitator drive from the motor to reduce the load thereon. It is also useful when the user is suddenly called away from the cleaning task because it is then only necessary to move the propelling handle to non-propelling position to prevent damage to the carpet during the time the operator is absent even though the motor may be left running.

While in the accompanying drawings and in the following description the invention is shown and described as applied to a suction cleaner of the type in which the casing of the motor fan unit is rigid with the propelling handle and is pivoted to the main chassis on a transverse horizontal axis, it is to be understood that the invention is not limited to that type cleaner but may be applied to any ambulant "on-the-floor" type cleaner.

Other objects and advantages of this invention will become apparent as the description proceeds when considered along with the accompanying drawings in which:

Figure 1 is a bottom view of the suction cleaner of this invention with certain parts broken away to show details;

Figure 2 is a sectional view taken on line 2—2 of Fig. 1; and

Figure 3 is a partial sectional view similar to Fig. 2 taken on line 3—3 of Fig. 1 showing the handle in storage position and the agitator raised upwardly into the suction nozzle.

Referring to the drawings and especially to Fig. 2 thereof the cleaner of this invention comprises a main casing or chassis generally indicated by the reference numeral 10. The casing 10 is mounted for ambulatory movement by fixed front wheels 11 and adjustable rear wheels 12 which will be described in more detail hereinafter.

The casing 10 includes a suction nozzle 13 in-

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cluding front and rear lips 14 and 15 respectively. The casing 10 also includes a pair of rearwardly extending aprons 16 and 17 (Fig. 1) extending rearwardly from the nozzle 13 in spaced parallel relationship.

Positioned between the aprons 16 and 17 immediately rearwardly of the front wheels 11 is the casing of a motor fan unit generally indicated by the reference numeral 20. The casing 20 is pivoted to the aprons 16 and 17 on a transverse horizontal axis by suitable bearings, one of which is indicated by the reference numeral 21.

The motor fan unit includes a motor driven shaft 22 which extends through the right hand pivoted joint 21 as viewed in Fig. 1. The end of the shaft 22 is in the form of a pulley 23 which extends into a channel 24 formed by a housing 25 as an integral part of the apron 16 and of the chassis 10.

The suction side of the motor fan unit is at the opposite end of the casing 20 from the pulley 23 and is in open communication with a suction passageway formed by the housing 26 which is an integral part of the apron 17 and of the chassis 10. The suction passageway thus formed is in open communication with the nozzle 13 as is well known in the art as exemplified by the patent to Burkhardt 2,225,621.

Rotatably mounted within the nozzle 13 is an agitator generally indicated by the reference numeral 28. The agitator 28 may be of the positive beating type or of the rotary brush type but is preferably of the positive beating type which includes beating bars 29 and agitating brushes 30 which may be arranged in any suitable manner relative to each other known to the art.

A pulley 31 is formed on the agitator 28 in alignment with the pulley 23 and a driving belt 32 extends through the channel 24 and over the pulleys to drivingly connect them.

The agitator 28 is mounted on a pair of crank arms at opposite ends of the nozzle 13 as shown at 35. The arms 35 are rigidly connected to opposite ends of a shaft 36 pivotally mounted on the chassis 10 in any suitable manner. Surrounding the shaft 36 is a torsion spring 37 which biases the arms 35 counter-clockwise as viewed in Fig. 2 against a suitable stop 65 mounted in the nozzle 13 and contacting a leg on the free end of one of the arms 35 as shown in Figs. 2 and 3. Agitator shaft 38 extends from dust caps 39 which support bearings interiorly of the agitator 28 as is well known in the art. The

agitator shaft 38 is retained within the notches 40 in the free ends of the arms 35 by means of a latch 41 held in closed position by a spring 42.

Also rigidly secured to the shaft 36 and forming an anchor for one end of torsion spring 37 is an arm 45 which extends upwardly and backwardly alongside one end of the casing 20 which cooperates with a roller 46 in a manner which will be hereinafter described.

The rear wheels 12 are rotatably mounted on a shaft 50 (Fig. 1) which in turn is pivotally attached to the main frame 10 by means of a U-shaped bracket 51 having the free ends thereof pivoted to a transverse shaft 52 attached to the under side of aprons 16 and 17. The shaft 50 extends upwardly through the apron 17 as shown at 53 and has an adjusting nut 54 (Fig. 2) threaded thereon whereby the rear wheels 12 may be adjusted relative to the casing 10 to vary the position of the nozzle lips 14 and 15 relative to the floor as is well known in the art.

Also pivoted to the shaft 52 and biased counter-clockwise as viewed in Fig. 2 by a spring 55 is a roller detent 56, the roller 57 of which contacts with recesses 58 and 59 in a sector 60 suitably secured to the periphery of the motor fan casing 20.

A handle 61 is rigidly attached to the casing 20 as shown in Fig. 2. The roller detent 56-57 is adapted to latch the handle 61 in either a horizontal position as shown in Fig. 2 or a vertical position as shown in Fig. 3.

An exhaust nozzle 62 is also rigidly attached to the casing 20 and extends therefrom in parallel relationship to the handle 61. A filter bag 63 is attached to the exhaust 62 in any suitable manner known to the art. A rubber furniture guard 64 extends across the front of the nozzle 13 and rearwardly along the sides of the aprons 16 and 17 as shown in Fig. 1. The guard 64 is secured to the casing 10 in any suitable manner known to the art.

Operation

During normal cleaning operation the agitator 23 is spring-biased against the surface covering being cleaned by the spring 37 so as to maintain the belt 32 in a taut condition. The distance the brushes 30 and the agitator bars 29 extend below the lips 14 and 15 is limited only by the length of the belt 32 and the stop 65 against which the free end of one arm 35 comes in contact to limit the maximum extension of the agitator below the nozzle lips.

When the handle is moved to vertical position as shown in Fig. 3, which is the natural position to leave the handle when using the cleaner for "off-the-floor" cleaning as when using converter tools or when the cleaner is left idle the roller or pin 46 comes into contact with the arm 45 and pivots it clockwise as viewed in Figs. 2 and 3. That in turn moves the agitator 28 clockwise upwardly and rearwardly into the nozzle 13 out of contact with the surface upon which the cleaner rests.

The relationship is also such that the above movement decreases the distance between the pulleys 23 and 31 to release the tension on the belt 32 so as to relieve the motor of the agitator load. It has been found that under such conditions the belt 32 will travel slowly over the pulleys 23 and 31 so that rotation of the pulley 23 will not wear one spot on the belt more than another.

While in the embodiment shown and described movement of the handle to vertical position raises the agitator upwardly into the nozzle, it is within the scope of the invention to raise the agitator upwardly into the nozzle by movement of the handle to any non-propelling position such as the horizontal position as shown in Fig. 2. To accomplish the foregoing it would only be necessary to modify the linkage between the agitator mounting means and the pivoted handle.

While I have shown but a single embodiment of my invention it is to be understood that this embodiment is to be taken as illustrative only and not in a limiting sense. I do not wish to be limited to the particular structure shown and described but to include all equivalent variations thereof except as limited by the scope of the claims.

I claim:

1. A suction cleaner comprising, a body, motor driven suction creating means carried by said body, a pulley driven by the motor of said suction creating means, said cleaner including a suction nozzle interiorly connected to the suction side of said suction creating means, a rotary agitator in said nozzle, said agitator being mounted for bodily movement upwardly into said nozzle toward and away from the surface contacting lips thereof, said agitator including a driving pulley, a transmission belt drivingly connected about said pulleys, said agitator mounting being pivoted to the lower rear portion of said nozzle in such manner as to be movable upwardly and rearwardly into said nozzle toward said motor driven pulley, a handle for propelling said cleaner over a surface to be cleaned, said handle being movable from a propelling position to a non-propelling position and means actuated by movement of said handle to its non-propelling position for pivoting said agitator mounting means upwardly and rearwardly into said nozzle away from the surface to be cleaned, the arrangement being such that upward and rearward movement of said agitator into said nozzle reduces the distance between said pulleys whereby the belt tension is slackened to such an extent that the driving contact between the belt and pulleys is released.

2. A suction cleaner comprising, a chassis mounted for ambulatory movement over a surface to be cleaned, said chassis including a suction nozzle and a pair of aprons extending rearwardly therefrom in spaced parallel relationship, a motor fan unit including a casing pivotally mounted between said aprons, each of said aprons forming a channel extending from said nozzle to the pivotal joint at opposite ends of said casing, a driving pulley on the shaft of said motor fan unit and extending into one of said channels, the other channel being interiorly connected to the suction end of said motor fan unit, said nozzle including front and rear surface contacting lips, a pair of arms pivoted to the rear lip at opposite ends thereof so that the free ends of said arms may be swung upwardly and rearwardly into said nozzle toward said pulley, an agitator rotatably mounted on the free ends of said arms and normally having the surface contacting portions thereof extending below said lips, a pulley on said agitator in alignment with said motor driven pulley, a driving belt surrounding said pulleys, a handle rigidly secured to said casing to control the pivotal movement thereof relative to said chassis, the arrangement being such that said handle has a propelling position and a non-

propelling position and means actuated by movement of said handle to its non-propelling position for pivoting said arms upwardly and rearwardly into said nozzle to move the surface contacting portion of said agitator above said lips. 5

3. A suction cleaner according to claim 2 in which the distance between said pulleys is decreased sufficiently to release the driving tension on said belt when said agitator is pivoted upwardly and rearwardly into said nozzle. 10

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